

TESTING FOR CARNIVORY IN *IBICELLA LUTEA*

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Introduction

After reading the article in Carnivorous Plant Newsletter by Siegfried Hartmeyer (1997) and reading Heslop-Harrison & Knox (1971), I decided to try to determine if *Ibicella lutea* could be insectivorous.

The ability of digestive enzymes to dissolve the thin gelatin layer on film was discussed in both articles as a means of determining carnivory safely and quickly. The film is first exposed and then developed but not fixed. The film used in the original paper was Kodalith ortho (ASA 12) and since I had some of this from a previous project, this is what we used as well. I teach in a program for "at risk" high school students and thought they might learn a lot from actually doing a real science project. Students were assigned various known plants (both insectivorous and non-insectivorous) as controls to compare to our test of *Ibicella*. Film pieces were attached to plant leaves and left for 24 hours. They were then looked at under a stereo-microscope to see if the film was dissolved or simply ripped off the plastic backing.

Testing

Three separate tests were conducted with insectivorous and non-insectivorous plants. All plants were grown at my home and not under any special conditions. The plants used in all tests were exposed to food-insects such as fruit flies, and were grown either outdoors or in open terraria.

For the first test at school, I tried to keep things simple. I noted that small insects were present on some of the leaves so I did not try to trigger the digestive response with yeast solutions as used in the literature. Students were told to avoid insects for fear that their digestive enzymes would contaminate the tests. I assumed the digestive response was already activated and/or the plant would test negatively and we would have to try again. The film was cut into pieces and those pieces were attached, gelatin side toward the plant, to selected leaves or plants. Tape was used to keep the film in place and ensure close contact between the film and plant. The film was left untouched for 24 hours until the following class period. The films were then examined under the microscope to see if the holes in the gelatin were due to dissolving by enzymes or had just been ripped off by the fluid on the leaves. Photographs of representative films were taken to show our results. I also took some film home and attached it to other plants, including unidentified hirsute yard weeds, to provide a larger sample group with which to compare.

There seemed to be a positive result for *Ibicella*. When the positive results were reported to the ICPS internet listserv, we found that others had gotten negative results in testing *Ibicella* (Meyers-Rice, 1998; Schlauer, 1998). A second set of tests was conducted in a very careful manner using the yeast solution as described in Hartmeyer (1997). The solution was left on the leaves for 12 hours and then the film pieces were attached as before. They were again left for 24 hours. This time we got negative results for *Ibicella* but noticed that there were interesting staining features for *Ibicella*, a poor enzyme test for *Byblis gigantea* and a fading of the film when tomato plants were tested. We wanted to see if we could clarify these test

results so that they would become clearly positive or negative. Tests were run for a third time, and the films were left for 48 hours. The results were clearer and *Byblis gigantea* was clearly insectivorous, tomatoes were clearly negative and *Ibicella* tested negative again (although the staining was still very clearly visible).

Our preliminary results for *Ibicella* must have been contaminated. Either insect digestive enzymes were on the leaf on the tested sections or the student accidentally got enzymes from an insectivorous plant on *Ibicella* when taking it out of the box the plants were transported in. After previewing this paper, Barry Meyers-Rice pointed out that the apparent enzymatic activity I observed in *Byblis filifolia* is very interesting since its close relative *B. liniflora* does not produce digestive enzymes. Since *B. liniflora* and *B. filifolia* are such close relatives, this matter deserves more study.

Plant	Comments on enzyme test
Test 1	
<i>Byblis filifolia</i>	Positive
<i>Drosera adelae</i>	Positive
<i>Drosera burkeana</i>	Positive
<i>Drosophyllum lusitanicum</i>	Positive
<i>Ibicella lutea</i>	Positive
Tomato	Negative
Unidentified yard weeds	Negative
Test 2	
<i>Byblis filifolia</i>	Positive
<i>Drosera adelae</i>	Positive
<i>Drosera binata</i>	Positive
<i>Drosera burkeana</i>	Positive
<i>Drosera capensis</i> —White Flower	Positive
<i>Drosera collinsae</i>	Positive
<i>Drosera graminifolia</i>	Positive
<i>Drosophyllum lusitanicum</i>	Positive
Tomato	Inconclusive or negative
<i>Byblis gigantea</i>	Inconclusive
<i>Ibicella lutea</i>	Inconclusive
Test 3	
<i>Byblis gigantea</i>	Positive
Tomato	Negative
<i>Ibicella lutea</i>	Negative, but with dark staining

References

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